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Network Communications Interface Requirements Document Between NASDA and NASA/NOAA for the ADEOS-II Project

Version 1.3

August 2002

Earth Observation Research Center

National Space Development Agency of Japan

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ii

Network Communications Interface Requirements Document Between NASDA and NASA/NOAA for the ADEOS-II Project

Version 1.3

August 2002

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iii

Network Communications
Interface Requirements Document
Between NASDA and NASA/NOAA
for the ADEOS-II Project

Version 1.3

August 2002

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iv

Network Communications
Interface Requirements Document
Between NASDA and NASA/NOAA
for the ADEOS-II Project

Version 1.3

August 2002

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v

Network Communications Interface Requirements Document Between NASDA and NASA/NOAA for the ADEOS-II Project

Version 1.3

August 2002

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vi

Network Communications
Interface Requirements Document
Between NASDA and NASA/NOAA
for the ADEOS-II Project

Version 1.3

August 2002

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vii

Document Update History

Version	Page	Update contents, reason, etc.
1.1		Original version.
1.2	ii ~ vii	Separated signature page for individual facilities.
	viii	Added “Document Update History (this page)”.
	3-2	Corrected miss wording in “3.6 NGN”.
	3-3	Clarified description of the explanation for the table 3-1 of “3.6 NGN”.
	4-1	- Deleted “Inventory data” from “4.1 Mission Operation Information Files”, and corrected related description. - Added instrument explanation which is not described in the “4.2 Instrument Data”.
	4-2	Added description for 4.2 (2) b) to matching the description of MOIS.
	4-5	Table 4-2[Part-1] was changed as below. - Added SeaWinds L0 multicast transfer for SeaPAC. - Data Sizes are specified for Processed DMS1 and DMS2. - Changed transferred products from EOC to PO.DAAC (AMSR L1B to AMSR L1A).
	4-7	Table 4-3[Part-1] was changed as below. - Added SeaWinds L0 multicast transfer for SeaPAC in the Table 4-2. - Data Sizes are specified for Processed DMS1 and DMS2. - Changed transferred products from EOC to PO.DAAC (AMSR L1B to AMSR L1A).
	4-10	Data Sizes are specified for DCS (MDR) L0 from NGN to NOAA.
1.3	x	Change EOSDIS/PO.DAAC as JPL/PO.DACC
	3-1	Change EOSDIS/PO.DAAC as JPL/PO.DACC
	3-2	Change EOSDIS/PO.DAAC as JPL/PO.DACC
	4-4	Table 4-2[Part-1] was changed as below. - GLI-1km L1A data size was updated regarding channel addition for over-saturation. Change EOSDIS/PO.DAAC as JPL/PO.DACC Correct AMSR L1A data size.
	4-6	Table 4-3[Part-1] was changed as below. - GLI-1km L1A data size was updated regarding channel addition for over-saturation. Change EOSDIS/PO.DAAC as JPL/PO.DACC Correct AMSR L1A data size

Abstract

The Earth Observation data and Information System (EOIS) is being developed by the National Space Development Agency (NASDA) of Japan for the purpose of exchanging earth observation data and information with satellite instrument providers and affiliated data centers. This data will support research by the international science community to develop a scientific basis for understanding global change.

NASDA is building the Advanced Earth Observing Satellite II (ADEOS-II) to provide data from a variety of space-borne sensors. The SeaWinds sensor is being supplied by Jet Propulsion Laboratory (JPL). ADEOS-II spacecraft data is received at ground stations at the Alaska SAR Facility (ASF), Wallops Flight Facility (WFF) , Kiruna and the Earth Observation Center (EOC). The requirements for interfaces between the EOIS and NASA/NOAA sites are presented in this document.

ix

Contents

Tables

1. Introduction

1.1 Identification

This Interface Requirements Document (IRD) defines the system interfaces and the interface requirements between NASDA and NASA/NOAA for the ADEOS-II Ground Segment. In addition, it describes data flows and specifies functional and performance requirements. The organizational requirements and responsibilities for the successful acquisition and distribution of data and information are presented.

NASDA has responsibility for the development and maintenance of this IRD with support by NASA/NOAA**.** Any changes in the interface definition must be agreed to by the relevant participating parties, and then approved by the EOIS Project Manager.

1.2 Scope

This IRD defines the system interfaces and provides functional and performance specifications for the electronic network interfaces between NASDA and NASA/NOAA ground segments. This document conforms to the terms and conditions of the "Memorandum of Understanding between the National Space Development Agency of Japan (NASDA), the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) for cooperation in the Advanced Earth Observing Satellite II (ADEOS-II) Program".

1.3 Purpose

This document is written to formalize the interpretation and general understanding of the interface between the NASDA Earth Observation Center and NASA/NOAA Ground Segments for the ADEOS-II project.

The objective of this document is to provide a focus for related Interface Control Documents (ICDs) which define the design of each interface.

2. Related Documentation

2.1 Parent Documents

The following documents are the parents from which this document's scope and content are derived.

- Memorandum of Understanding between the National Space Development Agency of Japan (NASDA), the National Aeronautics and Space Administration (NASA) and the National Oceanic and Atmospheric Administration (NOAA) for cooperation in the Advanced Earth Observing Satellite II (ADEOS-II) Program.
- ADEOS-II Mission Operations Implementation Plan between NASDA, NASA and NOAA (AD2-EOC-96-055).
- Operation requirements for ADEOS-II ground segment (AD2-EOC-1995-004)
- ADEOS-II Mission Operations Interface Specification (MOIS) Common Part (AD2-EOC-96-054)
- ADEOS-II Mission Operations Interface Specification (MOIS) (NASDA/NASA/NOAA) (AD2-EOC-97-046)

2.2 Information Documents

The following documents, although not directly applicable, amplify or clarify the information presented in this document, but are not binding.

- Requirements for NASA-NASDA Networks for Earth Observation Missions.
- "ADEOS-II Mission Simulation Test Plan" among NASDA, NASA and NOAA.
- "ADEOS-II to Ground Stations Interface Document" for NASA Ground Stations and NOAA.
- "ADEOS-II Spacecraft Orbital Operations Handbook, Volume XX (SeaWinds)."
- "SeaWinds Level 0 Format Description" among NASDA, JPL and NOAA.
- "AMSR Level 1A Format Specification" among NASDA, JPL and NOAA.
- "GLI Level 0 Format Description" for NOAA.
- "Format Description of Mission Operation Information Files (SEAWINDS)".
- "Format Description of Mission Operation Information Files (NGN)".
- "Format Description of Mission Operation Information Files (NOAA)".

3. System Descriptions

3.1 Relevant Organizations and Institutional Facilities

There are six relevant organizations that have responsibility for data system interfaces between NASDA and NASA/NOAA for the ADEOS-II Project:

- The NASDA Earth Observation Center (EOC)
- The NASDA Kiruna Ground Station
- The National Environmental Satellite Data and Information Service of the National Oceanic and Atmospheric Administration (NOAA/NESDIS)
- The SeaWinds instrument provider (SeaWinds Processing & Analysis Center (SeaPAC)) and JPL/PO-DAAC located at the Jet Propulsion Laboratory (JPL)
- The Alaska SAR Facility, Fairbanks, AK (ASF)
- The Wallops Flight Facility, Wallops Is., VA (WFF)

This section provides brief descriptions of each of these organizations that have roles and responsibilities for data system interfaces. Table 3-1 depicts the system level interfaces and their associated data flows between NASDA and NASA/NOAA.

3.2 EOC

The Earth Observation Center is located at Hatoyama, Japan. Instrument data are received using feeder-link stations and an X-band station at the EOC, are processed to near real-time data, Level 0 data and higher level products, and are distributed to related organizations.

Several major components of the EOIS, including the Data Distribution and Management System (DDMS), are located at the EOC. Within the DDMS is the Data Distribution Subsystem (DDS). The DDS is an automated system that is responsible for sending and receiving mission operation information files, near real-time data files and catalogue data files between the EOC and domestic and foreign agencies. Data is exchanged with the DDS through a handshake procedure that utilizes SMTP mail and FTP/gets.

3.3 NASDA/KIRUNA

A NASDA X-band ground station located in Kiruna, Sweden receives instrument data from ADEOS-II and transmits Level 0 data to the EOC.

3.4 NOAA/NESDIS

NOAA supports the Earth science user community by making data accessible from its data centers which archive and distribute Earth science data. NOAA also provides meteorological data sets in near real-time. NOAA/NESDIS, at its data center in Suitland, Maryland, will process SeaWinds and selected GLI 1Km data and provide processed data to authorized data users on a near real-time basis. Science data and products will be

archived and retrieved by the instrument data providing agencies.

3.5 JPL (SeaPAC and PO-DAAC)

The NASA SeaWinds Scatterometer Project (SeaWinds) at the Jet Propulsion Laboratory is part of NASA's Earth Observation Program. The SeaWinds instrument is a specialized microwave radar and will be used to continue the observational record of the NASA Scatterometer (NSCAT) instrument flown on ADEOS and SeaWinds on QuickScat for the frequent and accurate measurement of vector winds over the global ocean. The SeaWinds Project will operate the instrument.

The SeaWinds Project operates SeaPAC. SeaPAC receives the SeaWinds Level 0 data. SeaPAC monitors the near real-time health and safety of the instrument, determines long term instrument engineering trends and requests commands for controlling the instrument, and processes level 0 data to higher level science products.

SeaPAC provides higher level products to PO-DAAC for archive and distribution. JPL/PO-DAAC generates catalog (inventory and directory) information, archives the data sets and distributes standard data and catalog information. The JPL/PO-DAAC also advertises SeaWinds standard product availability, services user requests for products and provides user support for answering data format and distribution related questions.

3.6 NGN

The NASA/NOAA Ground Network (NGN) is managed by NASA for the coordination of data acquisition from passes not available to EOC at Hatoyama, Japan or Kiruna, Sweden. The NGN data acquisition stations are located at Fairbanks, Alaska and at Wallops Island, Virginia.

The following raw data will be transported from NGN stations to the EOC using magnetic media.

(1) Mode 1

ADEOS-II GLI-250m acquired via X1

(2) Mode 2

ADEOS-II GLI-250m data, Mission Data Recorder (MDR) recorded data and Optical Data Recorder (ODR) recorded data acquired via X1

The types of level 0 data provided by NGN are listed in Table 3-1.

Table 3-1 Level 0 Data Provided by NGN

Data Type	EOC Mode 1	NOAA Mode 1	EOC Mode 2	NOAA Mode 2	JPL Mode 2
DCS MRT	Yes	Yes	Yes	Yes	
DCS MDR			Yes	Yes	
SeaWinds MDR				Yes	Yes
ILAS MDR			Yes		
AMSR MDR			Yes		
DMS1 MRT	Yes		Yes		
DMS1 MDR			Yes		
DMS2 MRT	Yes		Yes		
DMS2 MDR			Yes		
HK MDR			Yes		Yes
TEDA MDR			Yes		
VMS MRT	Yes		Yes		
VMS MDR			Yes		
Selected GLI-1k MRT		Yes		Yes	
Selected GLI-1k MDR				Yes	

Footnote to Table 3-1: Note that all MDR including POLDER is recorded and shipped to the EOC on magnetic media. GLI-250 (in both Mode 1 and Mode 2) whenever received is also recorded by NGN and shipped on magnetic media. In summary, all data received at NGN stations via X1 in Mode 1 and Mode 2 is recorded on magnetic media and shipped to the EOC.

4. Data Flow Descriptions

This section provides data flow descriptions for the NASDA<->NASA/NOAA interfaces.

4.1 Mission Operation Information Files

Mission operation information files include instrument schedules, orbit data, and other messages sent by NASDA to the SeaWinds project, the receiving stations at WFF and ASF, and NOAA/NESDIS. Each US site (except NOAA/NESDIS) will send appropriate mission operation information files to NASDA.

There are 22 different types of Mission Operation Information Files which may be divided into eight descriptive groups as follows:

1. Operation request
2. Operation plan
3. Orbit data
4. Acquisition result
5. Message
6. Processing Information
7. Shipment and Readability Report
8. Command Request

While the number of Mission Operation Information Files may be relatively large, the total daily volume of these files is relatively small.

Details of the Mission Operation Information Files can be found in the "ADEOS-II Mission Operations Interface Specification" and "Format Description of Mission Operation Information Files".

4.2 Instrument Data

The ADEOS-II spacecraft will carry the SeaWinds sensor which is being supplied by Jet Propulsion Laboratory (JPL), the Global Imager (GLI) and Advanced Microwave Scanning Radiometer (AMSR) sensors which are being supplied by NASDA, the Improved Limb Atmospheric Spectrometer-II (ILAS-II) sensor which is being supplied by the Environment Agency of Japan, the Polarization and Directionality of the Earth's Reflectance (POLDER) sensor and the Data Collection System (DCS) which will collect data from Data Collection Platforms are being supplied by the Centre National d'Etudes Spatiales (CNES), Technical Data Acquisition (TEDA) and the Visual Monitoring System (VMS) and Dynamics Monitoring System (DMS) which gather information on spacecraft status and conditions are being supplied by Tsukuba Space Center (TKSC). DMS provides DMS1 data, which is accelerometer data, and DMS2 data, which is star tracker data.

The SeaWinds instrument, AMSR and GLI-1Km NASDA instruments, and DCS will operate continuously for global data acquisition. ILAS II and POLDER operate globally but not continuously. All instruments and

recorded satellite housekeeping data (except GLI-250m data) are formatted in CCSDS packets and recorded on Mission Data Recorders (MDR) at 6 Mbps. Three MDRs will be operated in rotation, such that when an MDR is in reproduce mode another MDR is recording.

Periodically during each orbit, the MDR recorded data is replayed at 60 Mbps, using the IOCS in Mode 1 or X1 in Mode 2.

ADEOS-II spacecraft data acquisition is performed using both IOCS and X band links during the mission life.

The DRTS Japanese data relay satellite is assigned to the ADEOS-II IOCS. Mission data are received at the EOC feeder-link station via IOCS.

Four ground stations, the Alaska SAR Facility, Fairbanks, AK (ASF), Wallops Flight Facility, Wallops Is., VA (WFF), Kiruna, Sweden and Earth Observation Center (EOC) in Hatoyama, Japan are used for X band reception.

Additionally, spacecraft and sensor housekeeping data are also received at the Tsukuba feeder-link station via K-band, at the NASDA Tracking and Control Station (TACS) and at the NASDA Transportable Station-Kiruna (NTSK) via S-band.

See MOIS common part for more detail ADEOS-II operation mode (Mode-1 and/or Mode-2).

Table 4-1 lists received mission data which is processed to Level 0 data at each station.

Table 4-1. Level 0 Data Files Produced at Receiving Stations

Mode	Receiving Station	Level 0 Data Products	
Mode 1	EOC	MDR	AMSR, SeaWinds, DCS, GLI-1km, HK Source, DMS1, DMS2
		MRT	DCS
		ODR	GLI 250m
	ASF, WFF, Kiruna	MRT	DCS, GLI-1km, DMS1, DMS2, VMS
Mode 2	EOC	MDR	SeaWinds, DCS, GLI-1km, HK Source, DMS1, DMS2
		MRT	DCS
		ODR	GLI 250m
	ASF, WFF, Kiruna	MDR	AMSR, ILAS-II, SeaWinds, DCS, HK Source, DMS1, DMS2, GLI-1 km, TEDA, VMS
		MRT	DCS, GLI-1km, DMS1, DMS2, VMS

EOC performs standard product processing which consists of Level 1, 2, 3 and a data set for the core sensors. SeaPAC will process the SeaWinds Level 0 data to Level 1 and Level 2 products.

Near real-time (NRT) data flows include:

SeaWinds, DCS and selected GLI 1km data flows to NOAA/NESDIS for weather forecasting, transmission to Project ARGOS and coastal watch monitoring purposes;

SeaWinds, HK, DMS1 and DMS2 data flows to JPL/SeaPAC for instrument monitoring and science data processing;

SeaWinds Met Data products produced by NOAA/NESDIS from its NRT data will be sent to NASDA/EOC.

Tables 4-2 and 4-3 list the overall network transmission performance requirements that will drive the network bandwidth requirements. "Network Performance Requirement" is the file transfer time from origin data server to destination data server within which the network must be capable of delivering the data. The following points apply in an overall manner to Tables 4-2 and 4-3:

1. Network Performance Requirements are based on the orbit simulation and tape recorder read out information in the MOIS Common Part. The exact numbers may change with changes in ADEOS-II orbital parameters and tape recorder read out strategy.

2. The values in the tables represent the nominal, routine situation.

3. Anomaly situations will require different data latency times. These are planned to be achieved not by a change in network bandwidth, but rather by a change in the priority in which the different data types are made available and transmitted. For example, in a spacecraft anomaly VMS and DMS data will have a much higher priority than in routine operations. To get these data to the EOC in the shortest latency, these data should be sent first.

4. During some periods individual instruments may have shorter latency needs. For example during ILAS II calibration the instrument team need their data much quicker. The tables assume the best way to deal with this is by a change in priority and not a change in bandwidth.

5. For data received at Wallops, the network performance requirements shown in the tables assumes the data has already been staged to the Central SAFS.

Table 4-2. NASDA - NASA/NOAA Network Performance (Mode 1) **[Part 1]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement
EOC	NOAA/ NESDIS	EOC	SeaWinds L0 ****	30.66/MDRPl	32 min.
			GLI-1km L1A (selected)	314.58/MDRPl	100 min.
			DCS (MDR) L0	8.03/MDRPl	100 min.
			DCS (MRT) L0	3.0/Contact	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A
		Kiruna	DCS (MRT) L0	1.0/Pass	100 min.
NOAA/ NESDIS	EOC	EOC	SeaWinds Met Data	25/Orbit	60 min.
EOC	JPL/ SeaPAC	EOC	HK Source	3.28/MDRPl	100 min.
			Processed DMS1**	2.91/MDRPl	100 min.
			SeaWinds L0 ****	30.66/MDRPl	100 min.
			Processed DMS2***	1.02/MDRPl	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A
JPL/ SeaPAC	EOC	N/A	Mission Operation Information Files	0.003/Day	N/A
EOC	JPL/ PO.DAAC	EOC	AMSR L1A	44/Half Orbit	50 min.
JPL/ PO.DAAC	EOC	N/A	Mission Operation Information Files	0.003/Day	N/A
EOC	ASF	N/A	Mission Operation Information Files	0.003/Day	N/A
ASF	EOC	ASF	DCS (MRT) L0	0.9/Pass	100 min.
			DMS1*,** (MRT) L0	0.28/Pass	100 min.
			DMS2*,*** (MRT) L0	0.03/Pass	100 min.
			VMS (MRT)*	N/A	N/A
		N/A	Mission Operation Information Files	0.003/Day	N/A

* VMS, DMS1 and DMS2 (MRT) – received at ASF and WFF only as backup
** Accelerometer Data
*** Star Tracker Data
**** SeaWinds L0 is multicasted from EOC to both NOAA/NESDIS and JPL/SeaPAC.
MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).
Contact – Maximum size from IOCS contact.
Pass – Maximum size from a pass over ground station

Table 4-2. NASDA - NASA/NOAA Network Performance (Mode 1) **[Part 2]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement
EOC	WFF	N/A	Mission Operation Information Files	0.003/Day	N/A
WFF	EOC	WFF	DCS (MRT) L0	0.9/Pass	100 min.
			DMS1** (MRT) L0	0.28/Pass	100 min.
			DMS2*** (MRT) L0	0.03/Pass	100 min.
			VMS (MRT)*	N/A	N/A
		N/A	Mission Operation Information Files	0.003/Day	N/A
ASF	NOAA/ NESDIS	ASF	DCS (MRT) L0	0.9/Pass	3 min.
			GLI-1 km (MRT) L0	310.95/Pass	100 min.
WFF	NOAA/ NESDIS	WFF	DCS (MRT) L0	0.9/Pass	3 min.
			GLI-1 km (MRT) L0	330.9/Pass	100 min.

* VMS (MRT) – received at ASF and WFF only as backup

** Accelerometer Data

*** Star Tracker Data

MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).

Contact – Maximum size from IOCS contact.

Pass – Maximum size from a pass over ground station

Table 4-3. NASDA - NASA/NOAA Network Performance (Mode 2) **[Part 1]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement
EOC	NOAA/ NESDIS	EOC	SeaWinds L0 ****	33.58/MDRPl	22 min.
			GLI-1km L1A (selected)	228.02/MDRPl	100 min.
			DCS (MDR) L0	8.79/MDRPl	100 min.
			DCS (MRT) L0	0.9/Pass	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A
		Kiruna	SeaWinds L0 ****	34.2/MDRPl	7 min.
			GLI-1km L1A (selected)	148.7/MDRPl	100 min.
			DCS (MDR) L0	8.9/MDRPl	100 min.
			DCS (MRT) L0	1.0/Pass	100 min.
NOAA/ NESDIS	EOC	All	SeaWinds Met Data	25/Orbit	60 min.
EOC	JPL/ SeaPAC	EOC	HK Source	3.6/MDRPl	100 min.
			Processed DMS1**	2.91/MDRPl	100 min.
			SeaWinds L0 ****	33.58/MDRPl	100 min.
			Processed DMS2***	1.02/MDRPl	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A
		Kiruna	HK Source	3.7/MDRPl	100 min.
			Processed DMS1**	2.91/MDRPl	100 min.
			SeaWinds L0 ****	34.2/MDRPl	100 min.
			Processed DMS2***	1.02/MDRPl	100 min.
JPL/ SeaPAC	EOC	N/A	Mission Operation Information Files	0.003/Day	N/A
EOC	JPL/ PO.DAAC	All	AMSR L1A	44/Half Orbit	50 min.

* VMS (MRT) – received at ASF and WFF only as backup

** Accelerometer Data

*** Star Tracker Data

**** SeaWinds L0 is multicasted from EOC/DDS to both NOAA/NESDIS and JPL/SeaPAC.

MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).

Contact – Maximum size from IOCS contact.

Pass – Maximum size from a pass over ground station

Table 4-3. NASDA - NASA/NOAA Network Performance (Mode 2) **[Part 2]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement (within)
EOC	ASF	N/A	Mission Operation Information Files	0.003/Day	N/A
ASF	EOC	ASF	ILAS-II (MDR) L0	81.65/Orbit	100 min.
			AMSR L0	77.6/MDRPl	100 min.
			HK source	3.63/MDRPl	27 min.
			DCS (MDR) L0	8.89/MDRPl	100 min.
			DCS (MRT) L0	0.91/Pass	100 min.
			DMS1** (MDR) L0	2.68/MDRPl	100 min.
			DMS2*** (MDR) L0	0.94/MDRPl	100 min.
			DMS1** (MRT) L0	0.28/Pass	100 min.
			DMS2*** (MRT) L0	0.10/Pass	100 min.
			VMS (MDR)	14.65/Orbit	100 min.
			VMS (MRT)*	14.65/Orbit	100 min.
			TEDA	0.14/MDRPl	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A

* VMS (MRT) – received at ASF and WFF only as backup

** Accelerometer Data

*** Star Tracker Data

MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).

Contact – Maximum size from IOCS contact.

Pass – Maximum size from a pass over ground station

Table 4-3. NASDA - NASA/NOAA Network Performance (Mode 2) **[Part 3]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement (within)
EOC	WFF	N/A	Mission Operation Information Files	0.003/Day	N/A
WFF	EOC	WFF	ILAS-II (MDR) L0	81.65/Orbit	100 min.
			AMSR L0	78.3/MDRPl	100 min.
			HK source	3.67/MDRPl	26 min.
			DCS (MDR) L0	8.97/MDRPl	100 min.
			DCS (MRT) L0	0.9/Pass	100 min.
			DMS1** (MDR) L0	2.71/MDRPl	100 min.
			DMS2*** (MDR) L0	0.95/MDRPl	100 min.
			DMS1** (MRT) L0	0.27/Pass	100 min.
			DMS2*** (MRT) L0	0.10/Pass	100 min.
			VMS (MDR)	14.65/Orbit	100 min.
			VMS (MRT)*	14.65/Orbit	100 min.
			TEDA	0.14/MDRPl	100 min.
		N/A	Mission Operation Information Files	0.003/Day	N/A

* VMS (MRT) – received at ASF and WFF only as backup

** Accelerometer Data

*** Star Tracker Data

MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).

Contact – Maximum size from IOCS contact.

Pass – Maximum size from a pass over ground station

Table 4-3. NASDA - NASA/NOAA Network Performance (Mode 2) **[Part 4]**

Source	Destination	Receiving Ground Station	Data Type	Data Size (MB)	Network Performance Requirement (within)
ASF	NOAA/ NESDIS	ASF	SeaWinds L0	33.9/MDRPl	17.2 min.
			DCS (MDR) L0	8.89/MDRPl	17.2 min.
			DCS (MRT) L0	0.9/Pass	3 min.
			GLI-1 km L0 (MDR)	394/MDRPl	100 min.
			GLI-1 km L0 (MRT)	310.95/Pass	100 min.
WFF	NOAA/ NESDIS	WFF	SeaWinds L0	34.2/MDRPl	16.2 min.
			DCS (MDR) ****	8.97/MDRPl	16.2 min.
			DCS (MRT) L0	0.9/Pass	3 min.
			GLI-1 km L0 (MDR)	285/MDRPl	240 min.
			GLI-1 km L0 (MRT)	330.9/Pass	240 min.
ASF	JPL/ SeaPAC	ASF	SeaWinds L0	33.9/MDRPl	17.2 min.
			HK Source	3.64/MDRPl	100 min.
WFF	JPL/ SeaPAC	WFF	SeaWinds L0	34.2/MDRPl	16.2 min.
			HK Source	3.67/MDRPl	100 min.

* VMS (MRT) – received at ASF and WFF only as backup

** Accelerometer Data

*** Star Tracker Data

MDRPl – Maximum size from MDR Playback (does not include “blind” path numbers 8, 22, 36 and 50).

Contact – Maximum size from IOCS contact.

Pass – Maximum size from a pass over ground station

5. Functional Interface Requirements

The requirements for the NASDA<->NASA/NOAA Ground Segment interfaces are as follows:

5.1 NASDA <-> NOAA/NESDIS Functional Requirements

EOC shall send a notification to NOAA/NESDIS upon availability of designated data files and Mission Operation Information Files.

NOAA/NESDIS shall, after notification by EOC, retrieve data files and Mission Operation Information Files from EOC.

NOAA/NESDIS shall acknowledge status of receipt (successful, error, etc.) of data files and Mission Operation Information Files to the EOC.

NOAA/NESDIS shall send a notification to the EOC upon availability of designated data files.

The EOC shall, after notification by NOAA/NESDIS, retrieve data files from NOAA/NESDIS.

The EOC shall acknowledge status of receipt (successful, error, etc.) of data files to NOAA/NESDIS.

5.2 NASDA <-> JPL/SeaPAC Functional Requirements

EOC shall send a notification to SeaPAC upon availability of designated data files and Mission Operation Information Files.

SeaPAC shall, after notification by EOC, retrieve data files and Mission Operation Information Files from EOC.

SeaPAC shall acknowledge status of receipt (successful, error, etc.) of data files and Mission Operation Information Files to the EOC.

SeaPAC shall send a notification to the EOC upon availability of designated Mission Operation Information Files.

The EOC shall, after notification by SeaPAC, retrieve Mission Operation Information Files from SeaPAC.

The EOC shall acknowledge status of receipt (successful, error, etc.) of Mission Operation Information Files to SeaPAC.

5.3 NASDA <-> JPL/PO-DAAC Functional Requirements

EOC shall send a notification to PO-DAAC upon availability of designated data files.

PO-DAAC shall, after notification by EOC, retrieve data files from EOC.

PO-DAAC shall acknowledge status of receipt (successful, error, etc.) of data files to the EOC.

PO-DAAC shall send a notification to the EOC upon availability of designated Mission Operation Information Files.

The EOC shall, after notification by PO-DAAC, retrieve Mission Operation Information Files from PO-DAAC.

The EOC shall acknowledge status of receipt (successful, error, etc.) of Mission Operation Information Files to PO-DAAC.

5.4 NASDA <-> ASF Functional Requirements

EOC shall send a notification to ASF upon availability of designated Mission Operation Information Files.

ASF shall, after notification by EOC, retrieve Mission Operation Information Files from EOC.

ASF shall acknowledge status of receipt (successful, error, etc.) of Mission Operation Information Files to the EOC.

ASF shall send a notification to the EOC upon availability of designated data files and Mission Operation Information Files.

The EOC shall, after notification by ASF, retrieve data files and Mission Operation Information Files from ASF.

The EOC shall acknowledge status of receipt (successful, error, etc.) of data files and Mission Operation Information Files to ASF.

5.5 NASDA <-> WFF Functional Requirements

EOC shall send a notification to WFF upon availability of designated Mission Operation Information Files.

WFF shall, after notification by EOC, retrieve Mission Operation Information Files from EOC.

WFF shall acknowledge status of receipt (successful, error, etc.) of Mission Operation Information Files to the EOC.

WFF shall send a notification to the EOC upon availability of designated data files and Mission Operation Information Files.

The EOC shall, after notification by WFF, retrieve data files and Mission Operation Information Files from WFF.

The EOC shall acknowledge status of receipt (successful, error, etc.) of data files and Mission Operation Information Files to WFF.

5.6 Further Requirements

In the case of errors in data file transmission, EOC, NOAA/NESDIS, SeaPAC, PO-DAAC, ASF and WFF shall follow procedures established for retransmission of files.

6. Interface Control Documentation Plan

An ICD will be prepared to supplement this IRD. The ICD includes the precise data contents and format of each interface. All modes (options) of data exchange for each interface are described as well as the conditions required for each mode or option. Additionally, data rates, duty cycles, error conditions, and error handling procedures are included. The sequence of exchanges (e.g., required handshaking) is completely described. Communications protocols are detailed for each interface.

Abbreviations and Acronyms

ADEOS	Advanced Earth Observing Satellite
ADEOS-II	Advanced Earth Observing Satellite II
AMSR	Advanced Microwave Scanning Radiometer
ASF	Alaska SAR Facility
CCSDS	Consultative Committee for Space Data Systems
CNES	Centre National d'Etudes Spatiales
DAAC	Distributed Active Archive Center
DCS	Data Collection System
DDMS	Data Distribution and Management System
DDS	Data Distribution Subsystem
DMS1	Dynamics Monitoring System - accelerometer data
DMS2	Dynamics Monitoring System - star tracker data
DRTS	Data Relay and Tracking Satellite
EOC	Earth Observation Center (NASDA/Japan)
EOIS	Earth Observation Data and Information System (NASDA)
EOSDIS	Earth Observing System Data and Information System
FTP	File Transfer Protocol
GLI	Global Imager
GSFC	Goddard Space Flight Center
HKDT	Sensor Housekeeping Data
ILAS-II	Improved Limb Atmospheric Spectrometer-II
ICD	Interface Control Document
IOCS	Inter-orbit Communication System
IRD	Interface Requirements Document
JPL	Jet Propulsion Laboratory
MDR	Mission Data Recorder
MDT	Multiplexed Data

MOIS	Mission Operation Interface Specification
MRT	Multiplexed Real-Time
N/A	Not Applicable
NASA	National Aeronautics and Space Administration
NASDA	National Space Development Agency of Japan
NESDIS	National Environmental Satellite Data and Information Service
NGN	NASA/NOAA Ground Network
NOAA	National Oceanic and Atmospheric Administration
NRT	Near Real-Time
NSCAT	NASA Scatterometer
PO-DAAC	Physical Oceanographic Distributed Active Archive Center
POLDER	Polarization and Directionality of the Earth's Reflectance
SAFS	Standard Autonomous File Server
SAR	Synthetic Aperture Radar
SeaPAC	SeaWinds Processing and Analysis Center
SeaWinds	NASA-JPL Scatterometer On ADEOS-II
SMTP	Simple Mail Transfer Protocol
TEDA	Technical Data Acquisition
TBD	To Be Determined
VMS	Visual Monitoring System
WFF	Wallops Flight Facility